



Progress 2016 Annual report of bean research and development activities in Burundi

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Outcome 1: Increased and gender equitable access to high yielding dry bean varieties and productive ICM technologies / information

Output 1.1. Competitive high yielding and stress tolerant varieties developed across various agro-ecologies and cropping systems in 20 countries

Activity set 1.1.1. Develop high yielding stress tolerant bush and climbing bean varieties adapted to climate change and variability including varieties with architecture conducive for mechanized systems for reduced drudgery at harvest stages

1.1.1.2 Collect local popular bean cultivars , clean and test and characterize and submit for release

- Local popular bean cultivars were collected in August 2015 in 5 provinces (Kirundo, Muyinga, Makamba, Gitega, Ngozi and Rutana).
- A total of 34 out of 50 cultivars collected were being cleaned and characterized on research station during 2016A.

1.1.11. Continue evaluation of germoplasme in PYT and AYT

- 4 sets of MRC lines from CIAT Kawanda are evaluated on research stations
- After seed increase and preliminary evaluation, selected lines for further evaluation are:
 - ❑ **MBC lines (tolerant to BCMNV):** 20 lines evaluated in PYT at Moso and Gisozi
 - The trial was repeated during 2016A cropping season.

❑ **MCA lines** (tolerant to ALS) :

➤ AYT was conducted at Murongwe and Gisozi during 2016A

❑ **MAC lines**: 9 lines selected for further evaluation at Murongwe.

❑ **BFS lines** (Tolerant to low soil fertility):

➤ 9 lines were selected out of 15.

➤ Since 2016A, selected lines were evaluated at multilocation sites (Murongwe and Moso).

1.1.1.12: Conduct PVS for lines developed drought/cooking time /for selected 4 market classes (Red mottled, Red kidney, Sugar and yellow)

- PVS were conducted with different selected genotypes
 - (a) Drought tolerant fast cooking and canning bean
 - (b) Root rot lines

(a) AYT Drought tolerant fast cooking and canning bean (bush)

- Drought tolerant lines and fast cooking materials (BCB11-315, BCB11-404, DRM11-20, DRK11-10 and Kenya sugar) were evaluated on farm.
- Farmers appreciations were based on high yield, earliness, grain color and market size.
- These 5 lines were selected and were tested in NPT since September 2015.
- **Post harvest handling and data records on-going.**

(b) PVS of advanced Root Rot lines + RWR2154 (biofortified)

- ROOT Rot lines and RWR2154 (biofortified lines) were evaluated on farm in Moso.
- Three genotypes were appreciated (RWR1092, ECDHR and RWR2154) for yield diseases tolerances and market demand.
- The selected lines were submitted to NPT since September 2015
- Actually, they are subjected to DUS test since February 2016.

Released varieties

- In December 2015, **7 varieties were officially released**
- Those varieties include **MAC44, RWV1129, MAC70, MUHORO, RWV1272, GSZ611 and CODMLB003**

1.1.1.13: Conduct demonstrations for best 'Bet varieties'

- Demonstrations with best bet varieties were conducted at different locations with released and pre-released varieties.
- A total of 17 varieties were used at different locations during 2015B and 2016A

- **Used varieties:**

MAC44, Muhoro, MAC70, RWV1129, GSZ611, Nakaje, IZO201543, Mukungungu, RWV2887, RWR2245, IZO2015110, Msolé, CODMLB003, IZO201299, IZO201245, KATB1 , KATX69 and Moore88002

- ***Sites:***

- ❑ **Makamba and Karusi:**

- 262 farmers (184 W and 78M)

- ❑ **Bujumbura rural area:**

- 38 farmers (37F and 1M)

- ❑ ***Gisozi and Murongwe :***

- 145 farmers (113 F and 32 M)

- ❑ **Rutana :**

- 128 farmers' (93W and 35M)

- ❑ **Kirundo:**

- 5 farmers' group with a total of 299 (174W and 125M)

1.1.1.15: Produce and maintain nucleus seed

- 23 varieties (selected and old varieties) were used
- A total of 560 kg was produced with a mean of 20 kg per variety
- Seed of promising genotypes were multiplied in order to facilitate further evaluation.

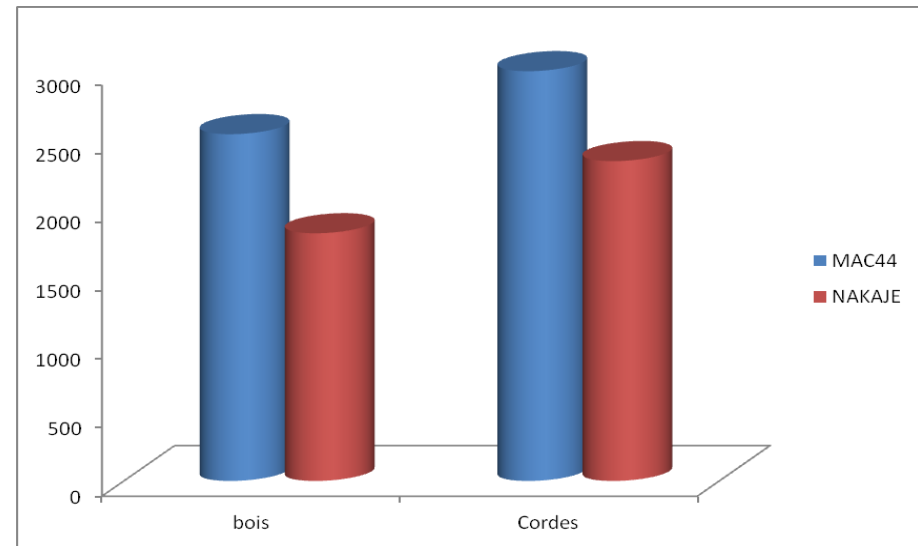
Output 1.2. Effective and economically viable ICM options for increased dry bean productivity and resilience identified and promoted

Activity set 1.2.1. Evaluate the effectiveness and economic feasibility of ICM options (including cropping systems) for higher bush and climbing bean productivity and adaptability to climate change and variability

Act 1.2.1.4.3 Intensifications of staking using strings

- Staking options through demonstrations plots were the main activities in 2015B and 2016A cropping seasons.
- The activity was conducted in different provinces: Bujumbura rural area, Mwaro, Gitega and Rutana.
- The target was to promote biofort varieties and the new climbing bean varieties while demonstrating staking option innovations
- Nakaje, MAC44, RWV1129, Gasirida and Muhoro were used

- Staking technique with strings is an alternative solution against the lack of staking materials.
- It provides several advantages such as higher yields than woody stakes, saving time during harvesting, protecting environment.
- On farm demonstration plots were used as FFS



- Field visit with farmers from different locations were organized
- One of them include in Dec 2015 the visit of the ministry of Agriculture and Livestock at Gisozi.
- He highly appreciated the new technology of staking beans with strings at farm level.
- In 2015B and 2016A, 226 demonstrations plots were conducted.
- 267 farmers (163W and 104M) participated

***Activity set 1.2.2. Develop and promote
effective post harvests storage and
handling practices/technologies***

1.2.2. Test effectiveness of post-harvest grain handling bean storage with small hermetic boxes) prototypes with farmers (eg, tripple bagging)

- *Test of Bean storage with Hermetic plastic bottles*
- Since 2013 CRS initiated bean Hermetic storage techniques, in response to the storage problems faced by small farmers showed positive effect.
- Hermetic jercans showed positive effect.
- More effective and affordable by small farmers with limited income.
- However, there was a lack of extension of this technology.

- Since July 2015, a test was conducted by **ISABU bean program**
- Hermetic plastic bottle were used on farm level by using participatory approach.
- 2 sites identified: Moso and Gisozi
- Varieties used : MAC44 and RW1129 (300 gr of grain for each treatment)
- From July 2015 to January 2016; results indicated that storage in small bottle container showed to protect beans at 92% compared to storage in small bags.
- Activity still in process

Output 1.4 Gender responsive delivery systems for seed of preferred dry bean varieties

Activity 1.4.1. Develop / deploy gender responsive delivery systems for dry bean varieties, pre and post-harvest ICM technologies (Linked with 2.1.6)

Activity 1.4.1.2. Develop promotional materials

- Leaflets on staking options, use of tithonia and improved agronomic practices, **Booklet** on bean crop management were developed in the last 2 years to create awareness and wide use of ICM technologies
- Those materials were again multiplied and distributed.

- 1650 leaflets were printed and distributed (950 distributed during agricultural shows, field visit, training and open days).
- 7 exhibition posters (varieties, ICM, bean based products and seed production by partners) were developed and used during PABRA-SDC launching meeting.

1.4.1.1 Produce Breeder (by NARS) and basic (NARS and Private) seed of newly released varieties

- Breeder and Pre-basic seed : 6231 kg (from which 2911 kg is breeder seed)
- Basic seed by private seed producer : 25786 kg
- Basic seed by farmers' group : 4978 kg
- **Total formal seed : 36995kg**

1.4.1.2 Engage private seed producers (companies, entrepreneurs) to produce certified and/or quality declared seed (QDS)

Certified seed

- Farmers' group : **4675 kg**

Quality declared seed (QDS)

- Farmers' group of Muyinga working with WV Burundi : **83000 kg (MAC44 & RWR2245)**
- Others farmers' groups (Rutana, Makamba, Mwaro) : **2450 kg**
- **Total for QDS = 85450 kg produced**
- Handling ongoing for 2016A

1.4.1.3 Train small and large scale seed producers and extension in pre and post-harvest seed management

- A ToT of seed producers and extension staff from Kirundo and Muyinga in pre-post management was organised in November 2015.
- A total of 37 were trained from which 30 farmer's leaders and 7 extensionists.

1.4.1.5 Enhance local national and regional awareness of newly released varieties and complementary ICM technologies

- In September 2015, The Ministry of Agriculture and Livestock in collaboration with **CAPAD** (local NGO) organized agr- seed fair.
- ISABU bean program participated to this agricultural show for promotion of new varieties and bean based products.

- In November 2015, ISABU organized agronomic day
- Bean program participated actively by exhibiting new varieties, bean based snacks, bean based composite flour and promotional materials such as leaflets, posters both scientific and exhibition posters.
- During launching meeting PRABRA-SDC initiative, bean program got opportunity to create awareness to exhibit its innovation technologies.

1.4.1.8 Assess the efficiency of seed and ICM delivery systems in reaching women and smallholder farmers (including cost/benefit analysis)

- In Kirundo province (Bugesera), trading channel is the most utilized for improved seeds dissemination.
- The existing pilot bean platforms constitute the second channel of improved seeds dissemination.

- Yellow bean varieties are considered as cash crop and attract more men for producing more for trading.
- In Rutana province in Moso region, the most channel of seeds dissemination is exchanged between individual farmers, followed by farmers' organizations channel.
- Some partners such NGOs and projects (CRS, WV, CAPAD, UCODE) are playing key roles in seed and ICM delivery system.

Immediate Outcome 2: Increased access to micronutrient rich bean products among the vulnerable groups in a gender equitable manner

Output 2.1 Micronutrient rich bean varieties with superior agronomic traits developed

Activity set 2.1.1. Evaluate and confirm grain nutrient (iron, zinc, proteins) content in introductions, landraces, released and pre-released varieties in relevant agro-ecological zones (GXE of trials)

2.1.1.6. Support partners to promote released and pre-released bean varieties

- Improved bean varieties rich in Fe and Zn (MAC44, RWR2245) were provided in Muyinga and Kirundo for multiplication and dissemination
- It has done through bean platform members.
- Bean program facilitated access to improved macronutrients rich varieties to our partners such as CRS and world vision.
- Actually MAC44 is widely disseminated and adopted.

Activity set 2.1.2: Develop and select from new and existing segregating populations for iron and zinc grain content levels with a target of developing varieties with >90 ppm Fe and > 35 Zn for selected market classes

2.1.2.9: Conduct PYT and AYT for lines developed for >90 ppm Fe and > 35 Zn lines /cooking time; (NUC and MNC lines)

- *Evaluation of new nutritional germoplasme (MNC and NUC)*
- **MNC = 12 lines out of 19 selected** for AYT
- **NUC = 9 lines out 14** selected for AYT

2.1.2.10: Conduct PVS for lines developed for >90 ppm Fe and > 35 Zn lines (NUV, NUA, and others promising varieties in pipeline

- Selected NUV lines in AYT (NUV130, NUV 14, NUV 30, NUV 41, NUV 91 and NUV 160.) were conducted in PVS at Mwaro and Murongwe
- According to farmers preferences, selected lines were NU91, NV130 and NUV30 for their high yield and early maturing.
- The selected varieties were submitted to NPT since 2016A.
- NUV91 and NUV130 are submitted to DUS test since 2016B.

2.1.2.11: Conduct demonstrations for best bet varieties developed for >90 ppm Fe and > 35 Zn lines

- Newly released and pre-released varieties were used in demonstration plots in 2015B and 2016 at Gitega, Karusi and Mwaro
- Used varieties: MAC44, MAC70, RWV1129, Muhoro, RWV2887, NUV91 and NUV130
- Cross village visit was organized for sharing experiences and appreciation for the new micronutrient rich varieties.

2.1.2.12: Conduct NPT, DUS release micro nutrient rich varieties

- Released varieties: MAC44, RWV1129, Muhoro and MAC70
- Since 2016B: RWR2245, NUV91, NUV130 and RWR2154 submitted to DUS

2.1.2.13: Produce and maintain nucleus seed of micro nutrient rich bean varieties

- 230 kg of nucleus seed was produced in 2015B
- Processing is on for 2016A.

Immediate Outcome 2: Increased access to biofortified bean varieties and bean based products among the vulnerable population

Output 2.1: Micronutrient rich bean varieties with superior agronomic traits developed

Act 2.1.5 Develop and strengthen the seed delivery system including the engagement of private sector and communities to produce quality seed and promote micro nutrient rich bean varieties considering the invisible traits/literacy levels

2.1.5.1 Produce Breeder (by NARS) and basic (NARS and Private) seed of newly released varieties

- In 2015B, breeder seed with biofortified varieties: **2001 Kg.**
- In 2016A: Handling ongoing on

2.1.5.2 Engage private seed producers (companies, entrepreneurs) to produce Certified or QDS

- Private seed basic producer : **MAC44=19Tons** (refers to 1.4.1.1)
- QDS by farmers of Muyinga working with NGO WV : **83 Tons (MAC44 &RWR2245)** (1.4.1.2)

2.1.5.4 Enhance local, national and regional awareness of released micronutrient rich varieties and complementary ICM technologies among policy makers, farmers, consumers, traders and other nutrition-sensitive stakeholders (Carry out demonstration, open and field days, agri- and seed fairs for promotion of new varieties and ICM options):

Refers to 1.4.1.5

Immediate Outcome 3: Increased access to profitable local and national markets in a gender equitable manner

Output 3.1: Commercial and nutrient dense bean-based products promoted through value chains in 7 target countries (3 of the countries targeting nutrition and gender sensitive value chains)

***Activity set 3.1.1: Develop and promote
value chains for processed and nutrient
rich bean products***

3.1.1.1.3 Identify and document key actors in the corridors as well as existing platforms with the focus on private sector

- Two women involved in Bean based flour commercialization for porridge or sauce have been identified: **Ms Christella and Ms Francoise SOTA**.
- Mrs Christella Ndayishimiye has been very active in commercializing bean flour for porridge during agricultural shows last September 2015.
- Since, she received a high demand of bean based flour.
- On Request of NGO WV, she started training farmers of Muyinga how to prepare bean based flour for porridge and the bean based snacks (Mandazi).


3.1.1.1.4 Screen and document bean varieties that will contribute to corridor activities in collaboration with marketers and breeders

- **MAC44** is a newly released variety
- It is highly appreciated in Burundi
- It is also released in Rwanda and probably in Tanzania
- It may be used in bean corridor as it is met in the 3 countries.
- The same case for RWV1129 in Burundi and Tz
- KATB1 in Bdi and Kenya

Lesson learned

- Climbing beans is an opportunity to nutrition security
- QDS is a nice way to promote our varieties through farmer's group and farmer's cooperatives (platform)
- Biofortified beans is another opportunity to contribute to nutrition issues

Way forward

- Aware farmers and extension services the importance of biofortified beans
 - Promoting biofortified beans
 - Need to implement bean breeding program in Burundi
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Aknowledgement

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Thanks for your attention
Murakoze cane